S
613.69
A16mtws
1992

STATE DOCUMENTS COLLECTION

JAN 2 2 1993

MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

MONTANA'S TAKE-ALONG WINTER SURVIVAL HANDBOOK

By
Larry Akers, Disaster Assistance Officer

STATE OF MONTANA
DISASTER & EMERGENCY SERVICES

PLEASE RETURN

MONTANA STATE LIBRARY
S 613.69 A16mtws 1992 c.2 Akers
Montana's take-along winter survival han
3 0864 00082439 4

MONTANA'S TAKE-ALONG WINTER SURVIVAL HANDBOOK

By
Larry Akers, Disaster Assistance Officer

STATE OF MONTANA
DISASTER & EMERGENCY SERVICES

a division of
Department of Military Affairs

1100 North Main, Helena, MT 59620
(406) 444-6911

OCTOBER 1992

Artwork: © 1992 Fred Cowie

TABLE OF CONTENTS

I.	INTRODUCTION	- 1 -
II.	WARNINGS	- 2 -
III.	NOAA WEATHER RADIO	- 4 -
IV.	MONTANA DEPARTMENT OF TRANSPORTATION REPORTS	- 5 -
V.	TAKING CARE OF A FRIEND	- 6 -
VI.	GETTING GOING	- 7 -
VII.	STARTING A COLD CAR	- 7 -
VIII.	WINTER DRIVING TECHNIQUES	- 8 -
IX.	ALL ABOUT TIRES AND TRACTION	- 10 -
X.	OTHER TIPS BEFORE YOUR TRIPS	- 11 -
XI.	AUTOMOBILE WINTER SURVIVAL KIT	- 11 -
XII.	AUTOMOBILE PARTS CAN SAVE LIVES	- 13 -
XIII.	IF STORM TRAPS YOU IN CAR	- 14 -
XIV.	SURVIVAL FOR OUTDOOR ACTIVITIES	- 15 -
XV.	WINTER SAFETY TIPS FOR THE HOME	- 18 -
XVI.	DRESS TO FIT THE SEASON	- 18 -
XVII.	WIND-CHILL INDEX	- 19 -
XVIII.	COLD WEATHER INJURIES	- 20 -
XIX.	PROTECTION FOR LIVESTOCK	- 22 -

Digitized by the Internet Archive
in 2013

http://archive.org/details/montanastakealon1992aker

I. INTRODUCTION

The intent of this publication is to provide basic survival information which may result in a life saved!

It is with a great deal of pride that the Montana Division of Disaster and Emergency Services (MT-DES) presents this handbook. The residents of Montana are great outdoors people. Outside activities range from work to pleasure; from agriculture, ranching and logging to hunting, snowmobiling and skiing.

Because of the size of The Big Sky State, Montanans do a great deal of traveling in the pursuit of their work and play. A large portion of this booklet has been devoted to tips related to safe winter driving and what to do if stranded. Did you know that a hubcap can save your life?

Each winter hundreds of thousands of Montana residents and out-of-state visitors take to our winter wonderland in pursuit of the most fantastic hunting available anywhere. Our ski resorts and cross country trails are second to none. With the advent of the snowmobile and the all-terrain vehicle, remote areas are now only a short time away. However, when all this modern technology fails, it may be a very long walk out. Do you know how to make a shelter with a jackknife and piece of string?

Ride along as we take you safely down the highway on a winter journey. Enjoy a snowy outing through Montana's breathtaking landscape, confident you have the gear to weather any storm. Allow us to give you some tips on weathering a storm at home. And last, but not least, some thoughts about caring for one of Montana's greatest economic assets, her livestock.

II. WARNINGS

The winter wonderland which makes Montana so beautiful can also be life threatening. Winter blizzards, heavy snows, ice storms, freezing rain and high winds can be a serious hazard to our citizens whether at work or play. One of the best defenses is to keep informed. By understanding and observing storm warnings, adequate preparation can be done to lessen the impact of hazardous weather on ourselves, our property and livestock. To take full advantage of weather forecasts, you must know the specific meanings of the terms commonly used:

A. **WATCH vs. WARNING**: Let's get a basic definition before we go any further. A watch means conditions are favorable for a storm, blizzard, tornado or whatever. A warning means, It's here partner!

B. **WINTER STORM WATCH**: Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow).

C. **WINTER STORM WARNING**: Severe winter weather conditions are imminent.

D. **HEAVY SNOW WARNING**: A snowfall of at least 4 inches in 12 hours or 6 inches in 24 hours is expected. (Heavy snow can mean lesser amounts where winter storms are infrequent).

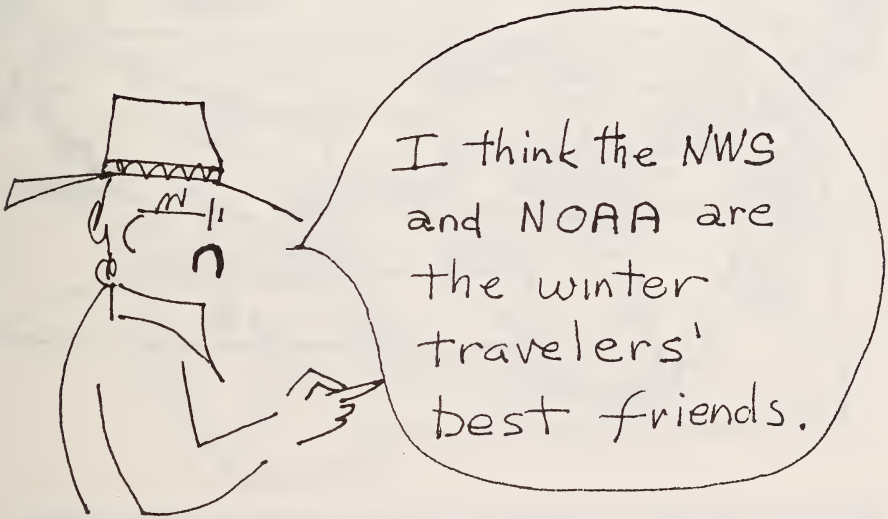
E. **BLIZZARD WARNING**: Considerable falling and or blowing snow and sustained winds of at least 35 miles per hour expected for several hours. Most of the snow in a blizzard is in the form of fine powdery particles which are whipped in such great quantities that at times visibility is only a few feet.

F. **HIGH WIND WARNING**: Sustained winds of at least 40 miles per hour or gusts of at least 50 miles per hour are expected to last for one hour. These thresholds are higher for the upper Yellowstone Valley and along the eastern front of the Rockies.

G. **WEATHER ADVISORY**: Weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life threatening.

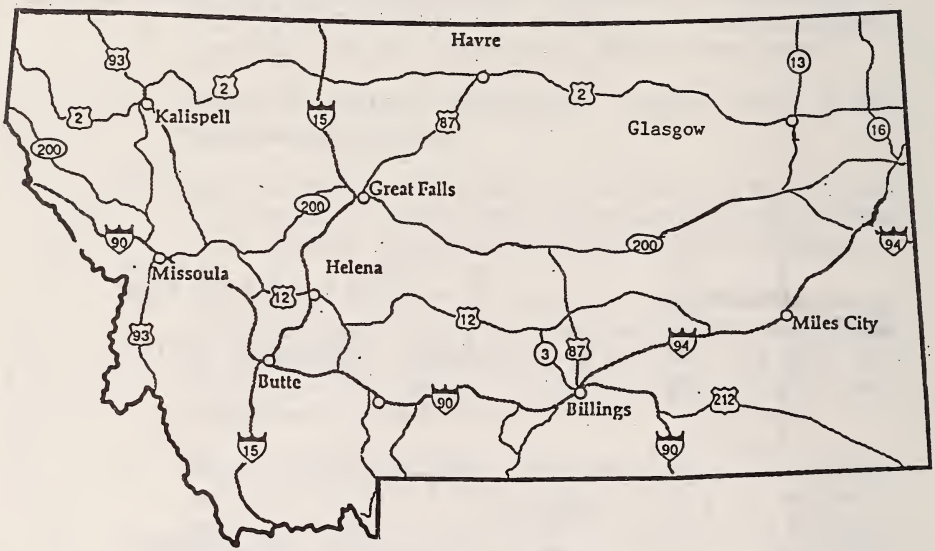
For current weather and forecasts call:

Billings	657-6988
Glasgow	228-4042
Great Falls	453-5469
Havre	265-6424
Helena	443-5151
Kalispell	755-4829
Missoula	721-3939



III. NOAA WEATHER RADIO

Newspaper, radio and television are all good sources of weather data. However, if you want the most accurate and timely information go to the source itself. You can listen to a weather radio designed to pick up broadcasts of the National Oceanic and Atmospheric Administration (NOAA). NOAA Weather Radio provides continuous broadcasts of the latest weather information directly from the National Weather Service Offices and these broadcasts are tailored for your specific area. A number of commercial manufacturers offer weather radios designed specifically for receiving NOAA's high frequency transmissions. NOAA Weather Radio broadcasts can usually be heard as far as 40 miles from the transmission site. In Montana there are nine stations; as seen on the map below.



The following NOAA weather frequencies are used in Montana (1-162.550 MHz or 2 -162.400 Mhz):

Billings	-	1	Missoula	-	2
Glasgow	-	1	Butte	-	1
Havre	-	2	Great Falls	-	1
Kalispell	-	1	Helena	-	2
			Miles City	-	2

IV. MONTANA DEPARTMENT OF TRANSPORTATION REPORTS

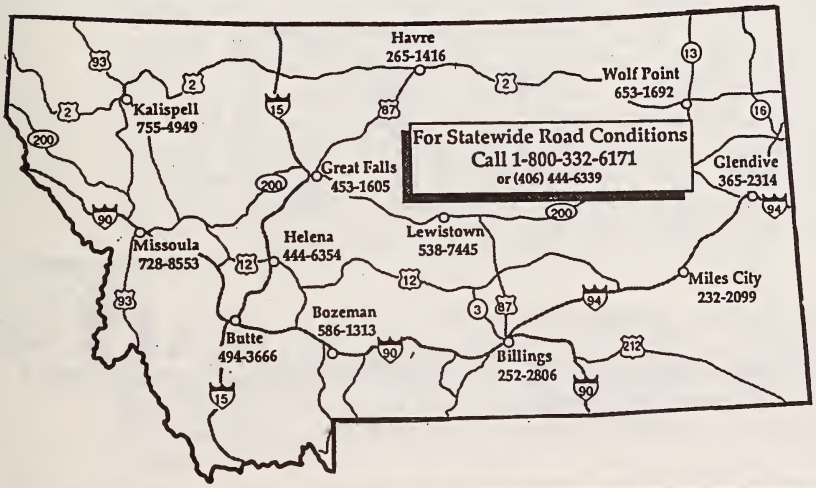
The Montana Department of Transportation (MDT) provides two distinct reports to inform travelers of road conditions within the state.

A. **WINTER ROAD REPORT**: Each year from the first Monday in October to the last Friday in April, the MDT provides two daily reports.

1. Road conditions in the vicinity of twelve Montana cities are described in reports available from local radio stations.
2. The statewide report summarizes conditions on the interstate system first, then major roads (beginning with roads in western Montana).

   Reports are updated at 7:30 am and again in the afternoon, seven days a week.

B. **CONSTRUCTION REPORTS:** From the first Thursday in May to the last Thursday in September, this program provides two weekly reports. The reports explain Helena area and statewide construction projects and reviews weekly weather conditions.



Road Information for Nearby States:

Wyoming	307-237-8411	Idaho	208-336-6600
North Dakota	701-224-2898	South Dakota	605-773-3571
Utah	801-964-6000	Washington	206-434-7623

Road Information for Nearby Provinces:

British Columbia	604-525-4997	Saskatchewan	306-787-7623
Alberta	403-471-6056		

V. TAKING CARE OF A FRIEND

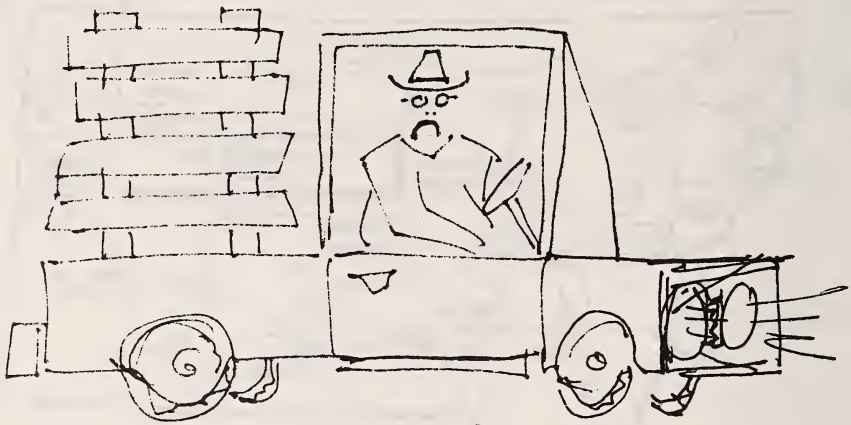
Your automobile can be your best friend or worst enemy, depending on your preparations. Many people totally ignore the maintenance of their car or pickup which may cause a very untimely breakdown. Following good common sense and the manufacturer's preventive maintenance schedule will go a long way to prevent you from being stranded. Make sure everything on this check list is in the best state of repair all year.

COOLING SYSTEM: Flush and protect the radiator and engine to well below 0.

LIGHTS: Front and rear,check for serviceability and cleanliness.

BATTERY AND IGNITION SYSTEM: Should be in top condition. Battery terminals must be clean.

EXHAUST SYSTEM: Check for leaks and crimped pipes; repair or replace as necessary.



FUEL SYSTEM: Replace filters, keep water out of system by maintaining a full tank of gas.

TIRES: Should have good tread; studs are best in winter.

HEATER, DEFROSTER AND WIPERS: These must be maintained for safety as well as comfort.

BRAKES: Check for wear, also check fluid level.

VI. GETTING GOING

Even with the best maintained vehicle, winter conditions present a variety of aggravating problems. Sometimes the problems can start with trying to get into the car. Freezing rain or moisture and sudden temperature drop can freeze locks. There are a number of lock thaw products on the market, most of which work best as a preventative measure. Try heating the key with a lighter. Another excellent heat source is an electric hair dryer.

VII. STARTING A COLD CAR

Starting it at below zero temperature is a terrible thing to do to your car. In addition to a well-tuned engine and good fuel, heat is the best solution for cold weather starting problems. Engine block heaters heat and circulate the water. They also keep the oil a little warmer, which greatly reduces engine start up wear. Even leaving a trouble light on overnight under the hood can keep a little of the cold out.

A. If your car won't start and you must use it, then you are going to require a battery boost. Check your battery fluid first. (If the fluid is frozen, chances are your battery is ruined and boost starting will not help.) Next, find someone willing to help with a battery of the same voltage. Leave the battery caps off both batteries. Hook up the booster cables to the live battery first, then hook the positive cable to the positive post of the dead car. Last hook the negative cable to a ground on the dead car (not the negative post); this will greatly reduce the chance of sparks and a resulting explosion. Run the engine of the live car at fast idle for a few minutes, if possible, to partially charge the dead battery. Start the dead car and remove the cables in reverse order.

B. Use extreme caution with starting fluid. Most starting fluids contain ether, which is very volatile. It is best to have a fire extinguisher available if you attempt this method. In addition to the chance of fire, the ether has a tendency to wash the lubricant from the pistons, which causes additional wear on an already cold engine.

C. And now for a note about water in your fuel system. Water can enter the fuel system by condensation. There is the possibility you may purchase fuel which has been contaminated with water. A solution to these problems is a product commonly called deicer; note, there's a difference between diesel and gas deicer. A good preventative measure is to periodically add a can to your fuel tank. It does no good to add it to a car which won't start because the deicer must circulate through the system to be effective.

VIII. WINTER DRIVING TECHNIQUES

Today, the number of four-wheel drive vehicles is at an all time high in Montana. However, two-wheel drive passenger cars still top the vehicle registration lists. With the salt-free environment of our state, and the mechanical genius of our people, many of the older rear wheel automobiles are still on duty. Driving characteristics vary greatly among 4X4, front-wheel drive and rear-wheel drive vehicles and are beyond the scope of this manual.

For our discussion we shall deal primarily with the conventional rear-wheel drive truck or passenger car.

A. When attempting to pull out or while going up a slippery hill, use the highest gear possible. This technique applies less power to the drive wheels resulting in less wheel spin. Don't gun the motor. Once your wheels begin to spin, you are in trouble. If you have good snow tires and chains, most hills can be negotiated. Coming down a slippery hill requires judicious use of the vehicle's gears. A lower gear can slow your momentum. This is good because you do not have to use the brake as often and there will be less chance locking the wheels. Caution must be used, however, as too low of a gear can cause too much drag and can also lock the drive wheels.

B. A few of today's new automobiles have an ingenious safety feature called antilock brake systems. These are designed to automatically pump the brakes to prevent wheel lock up. Most vehicles on the road do not have this feature. If you do lose control, try pumping your brakes with short repeated pumps instead of just stabbing the pedal to the floor and holding it there, and hoping for the best. If this method fails and it seems you are destined to hit something, you may have a choice. A nice snowbank is better than ramming another car or sliding through a crowded intersection.

C. Winter driving is different from summer driving in other respects. Ruts may form in the snow and ice and cause several problems. Once in the rut, it is difficult to steer out of it. In an attempt to steer out of a rut, you may be thrown out of control in another direction. High centering your vehicle can also result from ruts or snow build-up under your car.

D. Winter roadway width is usually narrower due to snowplow build-up. In this case, you do not have much margin for error in passing or meeting cars from the opposite direction. Roads that are intermittently dry and icy pose very interesting and dangerous driving problems. This situation calls for extreme caution, reduced speeds and more distance between yourself and other drivers.

E. Winter driving has a detrimental effect on some drivers. It may make them more nervous, frustrated, tense and perhaps even aggressive. Some drivers, no matter what, will try to drive in winter as they do in summer. Thus, it is even more important to drive defensively and be extra alert to what is happening around you. Drive even further down the road than normal; this means, watch for the driver or the situation that is a wreck about to happen and allow enough stopping distance or maneuver room.

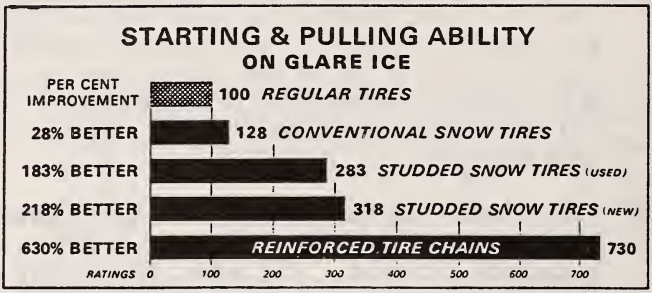
F. One point of concern that should be addressed regarding 4X4 and front wheel drive vehicles is stopping distance. Pulling power has absolutely nothing to do with stopping distance. Lock the wheels of a 4X4 on ice and you still have four approximately 6" X 8" patches of rubber sliding down the highway. Many 4X4 and front wheel drive owners are over-confident and that's just plain dangerous.

G. Cruise control can become a killer on slick highways! With cruise control, the car either accelerates or decelerates to maintain a constant set speed. This works fine on dry pavement. However, on icy or snow-packed roads use of cruise control can cause accidents. The car may sense a need for increased power to maintain its set speed just as you enter an icy spot. This would have the same effect as if you suddenly stepped down on the accelerator. The result is almost always a break of traction of the drive wheels and a dangerous loss of control.

H. If you do get stuck, before you go into the survival mode, there are a few things you can try. Above all remember, **DON'T OVER EXERT**; it's real hard to keep your mind on getting unstuck while undergoing a heart attack. First clear a path in front and behind your wheels. Get the sand bag out of your automobile survival kit and spread sand or gravel on the path you have just cleared. If you forgot the sand, try a floormat under the wheel, branches cut with the axe in your survival kit or just about any other thing you can think of to put under the wheels to give traction. Now try "rocking" yourself out. Accelerate forward until the car just begins to lose traction, then quickly move into reverse until the tires begin to break traction, then back the other way. You should gain a little ground each time and eventually break free. A good driver can master this technique with either a standard or automatic transmission; the trick here is timing between engine RPM and gear changes so you don't rip the universal joint out. Another idea is to gently accelerate with the emergency brake partially applied; this may prevent the drive wheels from losing traction quite as quickly.

IX. ALL ABOUT TIRES AND TRACTION

Probably more has been written on the subject of tires than any other part of the automobile. The problem is most of the literature is provided by the tire companies and their advertising claims just add to our confusion. Time was when we had a summer tire and a winter tire, now we have sort of a compromise called an all season tire. Like most compromises, the all-season really isn't as good as either tire it was intended to replace, certainly it is no panacea. The all-season tread probably falls somewhere between the regular category and the conventional snow tire on the following chart.



This chart summarizes the test results conducted by the National Safety Council on a glare ice course at Steven's Point, Wisconsin. These tests disclosed that conventional snow tires provided only a small improvement in pulling ability as compared with regular tires. Studded tires developed about three times the pull, while reinforced tire chains developed about seven times the pull of regular tires. Some drivers prefer to run studded or snow tires on all four wheels on their two wheel drive passenger cars. The rationale here is improved steering, handling and more predictable stopping. **(A WORD OF CAUTION - Studded tires are only legal in Montana from Oct 1 until May 31).**

No matter what tire you use, you'll have better luck if you take it easy. Don't spin your tires, spinning just causes friction, which turns snow to ice or digs you in deeper, so apply power gently. Slow down before it is necessary to apply brakes.

Keep the tire pressure at recommended levels for normal winter driving. When stuck, try letting some pressure out of the pulling tires; this puts more tread on the road and can actually help. If you deflate for traction, re-inflate to normal pressure as soon as possible.

The jury is still out on adding extra weight in the trunk. If done right it can increase traction. The negative side is the possibility of an ill-handling car, not to mention decreased gas mileage. If you do decide to add weight, don't overdo it. Make sure the weight is as close to being over the drive wheels as possible. Obviously weight in the trunk of a front wheel drive vehicle is counterproductive.

X. OTHER TIPS BEFORE YOUR TRIPS

Okay, so you have listened to the weather forecasts, checked the road reports, performed your before-operations maintenance and developed a survival kit. Now you are ready to go, right? Wrong! There are a few more things you should consider:

A. Let someone know when you are leaving, advise them of the route you are taking and when you expect to arrive at your destination. It's like filing a flight plan for your automobile trip.

B. If at all possible, travel in convoy with someone else; there is safety in numbers.

C. As you drive, listen to weather and travel information; road conditions can change mighty fast.

D. As part of your pre-winter cooling system check, do not forget the heater and defroster. These are safety items as well as comfort items.

E. Always keep a full tank of fuel. Stop often and fill up, especially if heading into sparsely populated country, like most of Montana. You are less likely to become stranded with a full tank. If you do become stuck, you will have enough fuel to run the engine and heater. Also, keeping the tank as full as possible will minimize water condensation in the tank.

F. Make sure the oil is of a light weight or a multi-weight viscosity. Heavier weight oils congeal more at low temperatures, do not lubricate as well and cause hard starting.

G. Make sure your headlights, tail lights and windows are clean so you can see and be seen. Your headlights can become covered by snow or dirt so gradually that you are not aware of the loss of illumination. With the reduced visibility from a storm, you want someone behind you to see your brake and tail lights.

H. Winter travel on interstates or other major highways will lessen the likelihood of becoming stranded.

I. If winter storm conditions exceed or even test your ability, seek refuge immediately, don't try for the next town.

XI. AUTOMOBILE WINTER SURVIVAL KIT

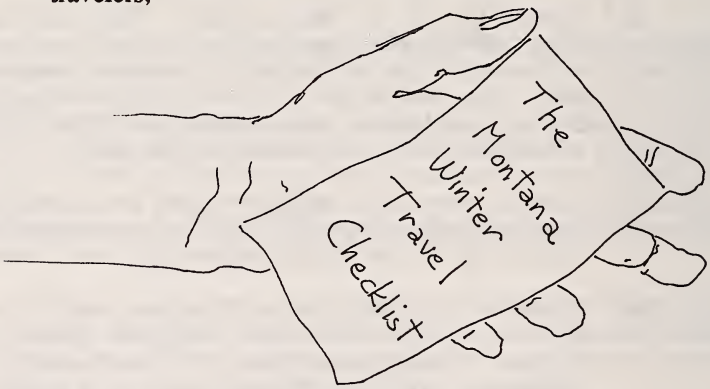
Winter travel, especially by passenger car, is serious business. You should always carry a survival kit. Your kit can be as extensive as you want, but you should include those items which would allow you to survive 12-24 hours without the benefit of the car heater. A

recommended list might include:

- One sleeping bag or two or more blankets for every person in the automobile;
- Three pound coffee can, which can be used to heat water;

  Note: Many of the other items on this list can be stored in the can.

- Matches and Candles (a blanket over your head, body heat and the heat from a single candle can prevent freezing);
- Flashlight and extra batteries, good for signaling for help;
- Winter clothing to include, cap, mittens, heavy socks, gloves, coveralls, etc, (all of these items can be old or out of style items no longer worn);
- First aid kit, including any special medications for you and your travelers;



- Bottled water will probably freeze, so allow expansion room in the container;
- Food - high energy; candy, nuts, raisins, sugar cubes, packaged condensed soups and hot chocolate, bouillon cubes; no perishables;
- Small sack of sand or kitty litter is good for traction;
- Shovel, one with a flat blade is preferable, use caution in shoveling snow, as overexertion is not advisable in a survival situation;
- Basic tool kit to include pliers, screwdrivers, adjustable wrench, tape and wire;

- Paper towels or toilet tissue, good for their designed purpose as well as for fire starter;
- Axe or saw, good for cutting wood for fire or branches to place under stuck tires for traction;
- Tow chain or strap, also a come-along is a handy device to recover your own vehicle;
- Spare tire, one with air works best;
- Wire and rope have a multitude of uses, to include automotive repair;
- Starter fluid, extra oil, gas line deicer and battery booster cables all come in handy and
- Signaling devices, such as railroad flares, can be seen for miles. A distress flag can be made from a piece of hunter orange or other bright colored material. Learn more in the following "*automobile parts can save lives*" section.

XII. AUTOMOBILE PARTS CAN SAVE LIVES

Even if you did not complete your survival kit, a calm head and systematic evaluation and dismantling of your vehicle can save your life. Put these automotive parts to good use:

- A hubcap or sunvisor can be substituted for a shovel;
- Seat covers can be used as a blanket;
- Floormats can be used to shut out the wind or for a wraparound;
- Engine oil burned in a hubcap creates a smoke signal visible for miles. To start the fire, prime with a little gasoline which you can get from your tank with a wire and tissue or rag;
- Don't forget your horn, it can be heard as far as a mile down wind. (Three long blasts, ten seconds apart, every 30 minutes, is a standard distress signal);

- A rear-view mirror can be removed and will serve as an excellent signaling device and

- For warmth and signal, burn a tire, (not on the car)! Release the air pressure, use gasoline, oil, or any other means to ignite it;

XIII. IF STORM TRAPS YOU IN CAR

Keep calm if you get in trouble. If your car becomes stuck or you become lost, **DON'T PANIC.** Think the problem through, decide the best thing to do, then do it slowly and carefully. If you are on a well traveled road, indicate you are in trouble. Remember the signaling devices in your survival kit. If by some chance you overlooked that part of this booklet, try flashing your directional signals, raising the hood on your car and tying something bright to your radio antenna. Then **STAY IN THE CAR!** and wait for help! The number one rule is **STAY IN THE CAR!!** Unless there is a house or other help in sight, very close, **STAY IN THE CAR!!!** If you run the engine to keep warm, do so sparingly and remember to open a window to protect yourself from carbon monoxide poisoning. Some other tips:

- Check the exhaust pipe of your car to insure snow has not blocked it. If this happens, you will surely get carbon monoxide in the interior compartment.

- Exercise, clap your hands, move your arms and legs vigorously or any other isometric exercises you know to keep the circulation going.

- Take turns on watch if there is more than one person. If you are alone do not go to sleep, **STAY AWAKE!**

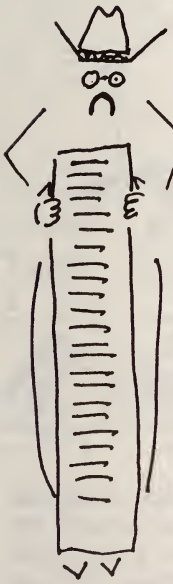
- Remember your horn. Also if there is a firearm present shoot into the air three shots, 10 seconds between shots and 30 minutes between volleys. (This is a universally recognized distress code among hunters and other outdoors people).

XIV. SURVIVAL FOR OUTDOOR ACTIVITIES

Montanans and tourists alike are taking to the field in increasing numbers both on foot and horseback. Many others access the back country with four-wheel drive vehicles, ATVs and snowmobiles. Occasionally hunters, skiers and other sportsmen become lost or stranded in desolate terrain in severe weather. The number one rule in the wilderness is **DON'T PANIC.** Don't rush to get out immediately. Many sportsmen have lost their lives because they refuse to admit to themselves and others that they got lost. They are convinced that their truck is just over the next hill. They literally run themselves to the point of exhaustion, hypothermia sets in and they die. ADMIT THAT YOU ARE LOST and get on with saving your life. If you can admit you are lost one hour before dark and you have the minimum survival gear, by putting that hour to good use you should suffer no more than a very uncomfortable night and a little harassment the next day.

A. BACKPACK SURVIVAL KIT

Whether you are an expert out-doors-man or a novice, whether you plan to be gone an hour or all day, you must be prepared to stay the night. Many of the car survival items can be transferred to the field. Your outdoors kit should be carried in a backpack and like the car kit, it can be quite extensive. However at a minimum, you should carry:



- this handbook;
- matches and lighter;
- candles;
- first aid kit;
- lightweight tarp or plastic;
- space blanket;
- hand saw or hatchet;
- canteen of water (U.S. Army type has a nice metal cup for heating water and cooking);
- whistle (plastic coach-type);
- signal mirror;
- compass and topographical map (of little use however if you don't know how to use them);
- commercial fire starter; # 000 steel wool works great;
- surgical tubing - good for drinking from streams as well as emergency tourniquet;
- all purpose knife - Swiss type is excellent;
- rope;
- tissue or paper towel;
- high energy food - sugar, candy, raisins, trailmix, soup, chocolate, mix, bullion cubes;
- tape and
- flashlight.

B. BUILDING A SHELTER

A calm mind and a good analysis of what resources are available can result in a very adequate shelter. In timber country you are limited only to your imagination. The lean-to is most popular today and easiest to construct. Cut two "Y" poles with your hatchet or pocket knife or use two trees with long limbs for the corner poles, place a cross pole between them; place small trees or branches from the cross pole to the ground, butt end up - small end on ground. Take the string or tape from your pack and Interweave cross members for more protection and warmth. Often a large downed log can make a good back for part of the shelter. Take advantage of rock overhangs, a series of dead, intertwined, downfall trees, etc. A realistic appraisal of your situation, a good imagination and sharp hatchet can make you the envy of your neighborhood.

In open country, take advantage of any depression, rock pile, abandoned auto, fence, etc., for a windbreak. Snow caves can provide the warmest shelter possible. Dig your cave on the leeward (downwind) side of a drift. Pine boughs, grass and sticks are suitable to cover the bottom of shelters, however plastic bags or ground tarpaulins are the best. The more pine boughs piled up, the more comfortable you will be.

While it is daylight, get your fire started. You will not start many fires directly from a match. Your survival kit should contain tissue paper, commercial fire starter tablets, steel wool, etc. Pine resin from the wound of a tree is a great starter. If the fire must be started on the snow, build a platform of logs or stones. Place the fire close enough to throw heat into your shelter. Use your space blanket or plastic bag against the back of your lean-to so as to reflect the heat. Once the fire is going, heat water (melt snow) in your canteen cup and heat some soup or chocolate. With a fire and something warm to drink, you can then turn your attention to improving your new home. With the time remaining, gather fuel, it takes an amazing amount to last the night.

C. STAY WITH YOUR SHELTER

Help will come! You must believe this! Montana has one of the best and fastest reacting Search and Rescue systems in the country. Be prepared to signal. As was mentioned earlier, three gunshots, three blasts from your whistle, three ground fires, etc. are universally recognized as a distress signal. You may be spotted from the air. In addition to your fire and its smoke, become familiar with the following ground-to-air signals:

Use natural materials to form the symbol. You can use brush, foliage of any type, rocks, or blocks of snow. In snow covered areas, tramp down the snow to form letters or symbols and fill with contrasting material such as twigs or pine boughs.

XV. WINTER SAFETY TIPS FOR THE HOME

A winter storm could isolate you in your home for several days. Be prepared to be without conventional forms of heating and cooking. As mentioned earlier, keep ahead of the storm by listening to the latest warnings and bulletins on radio and television. Then:

- Check battery powered equipment before the storm hits. A portable radio or television set may be your only contact with the outside world during a winter storm. Also check emergency cooking facilities and flashlights, gas lanterns, etc.
- Check your supply of heating fuel. Fuel carriers may not be able to move if a winter storm buries your area in snow. Wood stoves and fireplaces are excellent back-up heat and cooking sources if wood is available.
- Check your food supply. In case of power failure your food supply should include food that requires no cooking or refrigeration.
- Prevent fire hazards due to overheating of coal, oil or wood burning stoves, fireplaces and furnaces. Have chimneys professionally cleaned and inspected often.
- Stay indoors during storms. If you must go out, avoid overexertion.
- Don't kill yourself shoveling snow. It is extremely hard work for anyone in less-than-excellent physical condition and can bring on a heart attack, which is a major cause of death during and after storms.

XVI. DRESS TO FIT THE SEASON

If you spend much time outdoors during work or recreation, wear loose-fitting, lightweight, warm clothing in several layers. Layers of protective clothing are more effective and efficient than a single layer of tight, heavy clothing. Layers can be removed to prevent perspiring and subsequent chill, and can be replaced as you begin to feel the need for more warmth. Outer garments should be tightly woven, water-repellent and hooded. A hood or ski-type mask should protect much of your face and cover your mouth to ensure warm breathing and protect your lungs from extremely cold air. Mittens are better than fingered gloves.

XVII. WIND-CHILL INDEX

A very strong wind combined with a temperature slightly below freezing can have the same chilling effect as an actual temperature nearly 50 degrees lower. Arctic explorers and military experts have developed what is called the wind-chill factor, which shows the combined effects of wind and temperature as equivalent calm-air temperatures. The index describes the cooling power of the air on exposed flesh. The wind-chill table provided here shows this cooling power for various combinations of wind and temperature and will help you gauge how much protection you really need.

WIND CHILL
Equivalent Temperatures (° F)

Windspeed (Miles per hour)	Calm	35	30	25	20	15	10	5	0	−5	−10	−15	−20	−25	−30	−35	−40	−45
	5	33	27	21	16	12	7		−6	−11	−15	−20	−26	−31	−35	−41	−47	−54
	10	21	16	9	2	−2	−9	−16	−22	−27	−31	−38	−45	−52	−58	−64	−70	−77
	15	16	11	1	−5	−11	−18	−25	−33	−40	−45	−51	−60	−65	−70	−78	−85	−90
	20	12	3	−4	−9	−17	−24	−32	−40	−46	−52	−60	−68	−76	−81	−88	−96	−103
	25	7	0	−7	−15	−22	−29	−37	−45	−52	−58	−67	−75	−83	−89	−96	−104	−112
	30	5	−2	−11	−18	−26	−33	−41	−49	−56	−63	−70	−78	−87	−94	−101	−109	−117
	35	3	−4	−13	−20	−27	−36	−43	−52	−60	−67	−72	−83	−90	−98	−105	−113	−120
	40	1	−4	−15	−22	−29	−36	−45	−54	−62	−69	−76	−87	−94	−101	−107	−116	−128
	45	1	−6	−17	−24	−31	−38	−46	−54	−63	−70	−78	−87	−94	−101	−108	−118	−128
	50	0	−7	−17	−24	−31	−38	−47	−56	−63	−70	−79	−88	−96	−103	−110	−120	−128

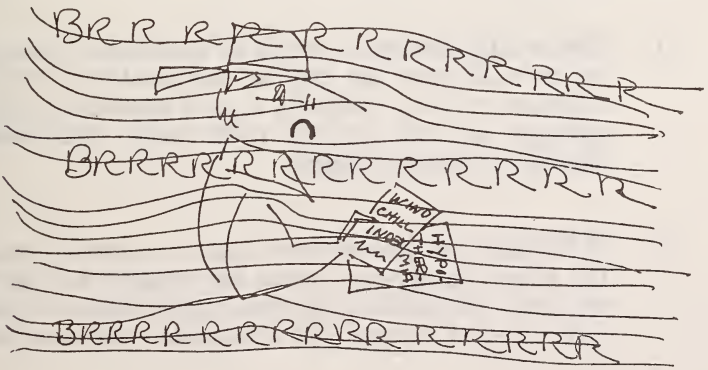
VERY COLD

BITTER COLD

EXTREME COLD

NOTE: Bitter Cold—flesh may freeze within one (1) minute.
Extreme Cold—flesh may freeze within 30 seconds.

Read right and down from calm air line. For example, an air temperature of 5° F has an equivalent cooling power of −32° F at a wind speed of 20 miles per hour.



XVIII. COLD WEATHER INJURIES

Every winter many unnecessary deaths occur. Listed below are some rather chilling statistics.

- Winter deaths related to snow and ice
  - -- About 70% are automobile related
  - -- About 25% are people caught out in the storm
  - -- The majority are males and over 40 years old

- Winter deaths related to exposure to cold
  - -- 50% are under 60 years old
  - -- Over 75% are males
  - -- About 20% occur in the home

A. **FROSTBITE** is a situation where ice crystals actually form in the victim's skin tissue. You can recognize it on others and maybe even yourself as grayish or yellow white spots on the skin. Treatment is to restore warmth to the affected area, but not too rapidly. If hot water is available do not use hotter than 105 degrees. Do not rub frozen flesh or forcibly remove gloves or shoes. Above all, do not rub frozen area with snow.

B. **CARBON MONOXIDE POISONING** is a deadly, colorless and odorless gas which can be present when gasoline engines or stoves are operated in an area which is not properly ventilated, such as an automobile, tent, camper etc. Usually there is no warning and no symptoms because carbon monoxide very subtly attacks the oxygen-carrying capability of the blood stream. It may be recognized as dizziness, throbbing headaches or pounding pulse. You may recognize it in others as blue lips, sleepiness or muscle twitching. Fresh air is the immediate cure; in others you may have to apply artificial respiration. Prevention is proper ventilation.

C. **SNOW BLINDNESS** is caused by unprotected eye exposure to the glare off snow and may be compounded by high altitude. Treatment of snow blindness is cold compresses, aspirin and bandages over the eyes for 16-20 hours. Prevention is the wearing of protective glasses.

D. **SUNBURN** can occur in snow country, especially high altitude. The injury can be very painful, but responds well to treatment and time. Prevention is approved suntan lotions or sunscreens. Cover as much exposed skin as possible while outdoors.

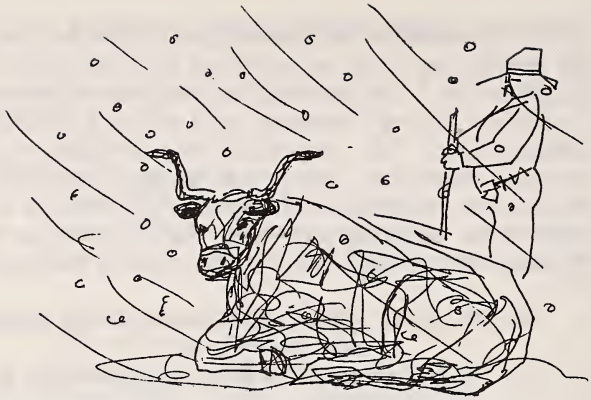
E. HYPOTHERMIA Commonly called exposure, is known to be the number one cause of accidental death in outdoor activities. Hypothermia is the lowering of body temperature under any conditions, although moisture, wind and cold most often are the leading causes. It is compounded by a combination of improper clothing, inadequate shelter and energy depletion. If body temperature goes below 95 degrees Fahrenheit, it continues to drop at an ever-increasing rate. In a short time, the victim becomes unconscious and often the result is freezing to death.

1. **SYMPTOMS** to watch for in ourselves and companions are:

   - Poor coordination - Repeated stumbling, poor control of arms and legs;
   - Careless attitude, decreased attention span, daze and memory lapse;
   - Uncontrolled shivering, drowsiness, blurred speech, confusion;
   - Weakness, slowing pace, unable to maintain muscle movement;
   - Disorientation and possible hallucinations and
   - Collapse.

2. **TREATMENT** for hypothermia:

   - Prevent further heat loss any way possible;
   - In advanced hypothermia the body cannot rewarm itself and must be rewarmed from external sources (hot, sugary drinks if victim is conscious);
   - Give mouth-to-mouth resuscitation if breathing stops;
   - If possible, force victim to exercise and
   - Furnish external heat slowly, extremely fast heating can also cause damage, so use caution.



XIX. PROTECTION FOR LIVESTOCK

Blizzards take a terrible toll on livestock. For both humane and economic reasons, stockmen should take necessary precautions in advance of severe winter storms.

- Move livestock, especially young livestock, into sheltered areas. Shelter belts, properly oriented and laid out, provide better protection for range cattle than shed type shelters.

- Sheds may cause cattle to overcrowd, with consequent overheating and respiratory disorders. Cattle running in brush country or lowlands with timber usually survive all right if feed, water and salt are available.

- Well-fed stock with a reserve nutrition supply will weather a blizzard much better than a herd which is fed only the minimum. It is recommended that stockmen check with their local county agent to determine the correct feed portion to insure an adequate reserve.

- Haul extra feed to feeding areas before the storm arrives. Storm duration is the largest determinant of livestock losses. If the storm lasts more than 48 hours, emergency feed methods may be required. Concentrates in the form of pellets or cakes are excellent for providing emergency rations.

- Autopsies of cattle killed by winter storms have shown the majority of deaths to be caused by dehydration, not cold or suffocation. Because cattle cannot eat enough snow to satisfy their water intake, stockmen are advised to use water tank heaters to provide livestock with water.

- After a blizzard of several days duration, cattle that have been without salt frequently suffer from salt starvation. Take care also that stock do not get too much salt during the recovery period.

NOTES

NOTES

The Montana Division of Disaster and Emergency Services wishes to thank the following agencies for the information they shared with us during the research and production of this handbook. The Federal Emergency Management Agency, the U. S. Department of Commerce, The American Red Cross, The National Weather Service, the Montana Department of Transportation, and the Emergency Management Agencies of North Dakota, South Dakota, Wyoming and Washington. A special thanks goes to the United States Army who for twenty years gave the author of this booklet an opportunity to learn much of this information first hand.

This publication has been funded in part by the Federal Emergency Management Agency (FEMA) under assistance agreement award ID # EMD-92-K-0162. The contents herein do not necessarily reflect the views and policies of FEMA, nor does mention of trade names or commercial products constitute endorsement or recommendations for use.

10,000 copies of this public document were published at an estimated cost of 45¢ per copy, for a total cost of $4,500.00, which includes $4,500.00 for printing and $.00 for distribution.